

requests acknowledgment thereof.

Establishment of Continued Prosecution Application

A request for a Continued Prosecution Application (CPA) is being filed concurrently with this response and amendment. Applicants respectfully request entry of the CPA in this case. Applicants submit that the present case is eligible for a CPA since it was filed before May 29, 2000, and no previous CPA has been filed in the application.

Applicants further submit that, upon entry of the Continued Prosecution Application in this case, the filing date of the application (CPA) becomes today, November 22, 2002.

Rejection of Claims 1-3 and 10
Under 35 U.S.C. 112, Second Paragraph

Claims 1-3 and 10 stand rejected under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter. As a basis for this rejection, the Office Action states that the limitation "the outlet" in lines 17 and 24 of claim 1 lacks sufficient antecedent basis.

RESPONSE

Applicants have amended claim 1 to provide sufficient antecedent basis for the outlet, thus removing the basis for this rejection. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection.

Rejection of Claims 1, 3 and 10 Under 35 U.S.C. 103(a)

Claims 1, 3 and 10 stand rejected under 35 U.S.C. 103(a) as being obvious over van Klinken et al. (U.S. Patent No. 4,039,429) in view of Friday et al. (U.S. Patent No. 6,183,627) for the reasons set forth in the Office Action.

RESPONSE

Applicant respectfully traverses this rejection and requests reconsideration and withdrawal thereof.

The references of record, van Klinken et al. and Friday et al., do not teach or suggest applicants' inventive subject matter as a whole, as recited in the amended claims. Further, there is no teaching or suggestion in the references which would lead the ordinary skilled artisan to modify them to derive the subject matter as defined in the amended claims.

The U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under

§ 103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of nonobviousness.

To establish a *prima facie* case of obviousness, the Examiner must establish: (1) that some suggestion or motivation to modify the references exists; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all the claim limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

A *prima facie* case of obviousness must also include a showing of the reasons why it would be obvious to modify the references to produce the present invention. See Ex parte Clapp, 277 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner bears the initial burden to provide some convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings. Id. at 974.

A. The Present Inventive Subject Matter

As amended, claim 1 is drawn to an apparatus of processing heavy hydrocarbon feed comprising: a heater for heating said heavy

hydrocarbon feed; an atmospheric fractionating tower for fractionating the heated heavy hydrocarbon feed fed to the inlet of the atmospheric fractionating tower producing light atmospheric fractions and atmospheric bottoms; a further heater for heating said atmospheric bottoms and producing heated atmospheric bottoms; a vacuum fractionating tower for fractionating said heated atmospheric bottoms and producing light vacuum fractions and vacuum residue; a solvent deasphalting (SDA) unit for producing deasphalted oil (DAO) and asphaltenes from said vacuum residue; a deasphalted oil thermal cracker for thermally cracking said deasphalted oil (DAO) and producing thermally cracked deasphalted oil, a thermally cracked deasphalted oil connector connecting an outlet of said deasphalted oil thermal cracker to an inlet of said atmospheric fractionating tower so that said thermally cracked deasphalted oil is recycled to the inlet of said atmospheric fractionating tower; and a light vacuum fraction thermal cracker for thermally cracking said light vacuum fractions for producing thermally cracked light vacuum fractions, a thermally cracked light vacuum fractions connector connecting an outlet of said light vacuum fraction thermal cracker to an inlet of said atmospheric fractionating tower so that said thermally cracked light vacuum fractions is recycled to the inlet of said atmospheric fractionating tower.

Dependent claims 3 and 10 have been canceled without prejudice or disclaimer to the subject matter contained therein, thus removing the basis of the rejection of those claims.

B. The Prior Art

In contrast, van Klinken (U.S. Patent No. 4,039,429) discloses a combination of processes that are designed to convert atmospheric reduced crude to light products through conversion by Fluid Catalytic Cracking (FCC). Van Klinken discloses several combinations of vacuum distillation, visbreaking, deasphalting and FCC to obtain light products.

Friday et al. (U.S. Patent No. 6,183,627) discloses upgrading of a hydrocarbon feed containing sulfur, metals, and asphaltenes involving applying the feed to a distillation column for producing a substantially asphaltene-free, and metal-free distillate fraction and a non-distilled fraction containing sulfur, asphaltenes, and metals. At least some of the substantially asphaltene-free, and metal-free distillate fraction is converted to a hydrogen donor diluent. The non-distilled fraction is processed in a solvent deasphalting unit for producing a deasphalted oil stream and an asphaltene stream. After a combined stream is formed from the hydrogen donor diluent and the deasphalted oil stream, the combined stream is thermally cracked forming a thermally cracked stream that

is applied to the distillation column.

C. Differences between the Claimed Subject Matter
and the Prior Art

The differences between applicant's inventive subject matter and the cited reference are readily apparent from their independent and distinct disclosures. The differences between the presently claimed subject matter and van Klinken are not merely directed to the use of a thermal cracker (present claims) versus a catalytic cracker (van Klinken). The present inventive subject matter involves two different thermal crackers: a deasphalted oil thermal cracker and a light vacuum fractions thermal cracker. Claim 1 has been amended to emphasize that the present inventive subject matter is directed to a combined distillation/SDA/thermal cracking system **that recycles the thermally cracked products to the distillation/SDA system.** The recycle of the thermally cracked product allows the system to reject the very heavy insolubles, thus making it possible to extend the conversion range. This subject matter is apparent from claim 1, where the thermally cracked products from both the deasphalted oil thermal cracker (subparagraph f)) and the vacuum light fractions thermal cracker (subparagraph g)) **are recycled to the inlet of the atmospheric fractionating tower.** Thus, as has been said in previous responses,

it is important that the thermally cracked products be recycled to the atmospheric fractionating column. Applicant respectfully submits that van Klinken et al. **fail** to disclose or render obvious these features to the present inventive subject matter.

In particular, Applicant respectfully submits that van Klinken **does not** disclose the recycle of the **thermally cracked products to the atmospheric distillation column**, since van Klinken et al. disclose **catalytic cracking**, not thermal cracking. In addition, Applicant respectfully submits that there is no motivation or teaching to recycle the van Klinken **catalytically cracked** product because the catalytic cracking employed **consumes any heavy materials produced therein** by the catalyst. In other words, if properly used, the van Klinken process **will not produce many heavy materials** because the catalyst present in the cracker will prevent that from happening. In fact, the main reason that the catalyst is included in the cracker is exactly to prevent the production of many heavy materials. Thus, with no heavy materials present, there is no reason to modify the van Klinken in an attempt to achieve the present subject matter.

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Turning now to Friday et al., Applicants respectfully submit that this patent is no longer a valid reference against the present application. The Friday et al. patent was issued on February 6,

2001, which is after the filing date of the present application. Thus, in order to use the Friday et al. patent as prior art, the Examiner must be relying on 35 U.S.C. 102(e) which says that a U.S. patent is prior art as of its filing date. In that case, the Friday et al. would be considered prior art.

However, Applicant would like to draw the Examiner's attention to 35 U.S.C. 103(c), which says that subject matter developed by another person (true in this case as the inventorship is different between the Friday et al. patent and the instant application) which qualifies as prior art **only** under one or more of 35 U.S.C. 102(e), (f) or (g) shall not preclude patentability under section 103 of 35 U.S.C. where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. Applicant respectfully submit that the Examiner is relying on 35 U.S.C. 102(e) to bring the Friday et al. patent in as prior art and [the Friday et al. patent and the instant application have both been assigned to Ormat Industries Ltd. of Yavne, Israel.] 35 U.S.C. 103(c) was amended by the American Inventors Protection Act (the AIPA) to include 102(e) as prior art knocked out by its provisions. The AIPA was enacted on November 29, 1999 and the amendments to 103(c) apply to applications filed on or after that date. By filing the Continued Prosecution Application with the present

response, the effective date of the present application is now November 22, 2002 for the purposes of 103(c). Therefore, Applicant respectfully submits that the post-AIPA 35 U.S.C. 103(c) controls in this case, and therefore, the Friday et al. patent is not proper prior art to be relied on in rejecting the instant claims.

Since the Friday et al. patent is not valid prior art against the instant claims, the Examiner has failed to make a *prima facie* case of obviousness against claim 1, especially since van Klinken is deficient in disclosing all of the claimed elements of claim 1 and the Examiner was relying on Friday et al. to supply missing elements.

Accordingly, Applicants respectfully submit that claim 1 is not obvious over the prior art and respectfully request reconsideration and withdrawal of this rejection.

Rejection of Claim 2 Under 35 U.S.C. 103(a)

Claim 2 stands rejected under 35 U.S.C. 103(a) as being obvious over van Klinken et al. (U.S. Patent No. 4,039,429) in view of Friday et al. (U.S. Patent No. 6,183,627) and further in view of Bigeard et al. (U.S. Patent No. 6,153,087) for the reasons set forth in the Office Action.

RESPONSE

Applicant has canceled claim 2 without prejudice or disclaimer to the subject matter therein, thus removing the grounds for this rejection. Accordingly, Applicant respectfully requests reconsideration and withdrawal of this rejection.

CONCLUSION

In view of the foregoing, applicants respectfully request the Examiner to reconsider and withdraw the all pending rejections, and to allow all of the claims pending in this application.

If the Examiner has any questions or comments regarding this matter, he is welcomed to contact the undersigned attorney at the below-listed number and address.

Respectfully submitted,

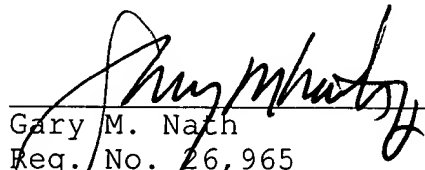
NATH & ASSOCIATES

Date:

November 22, 2002

NATH & ASSOCIATES

1030 Fifteenth Street, N.W.
Sixth Floor
Washington, D.C. 20005
Tel: (202) 775-8383
Fax: (202) 775-8396
GMN:JLM:sv/rrr.wpd



Gary M. Nath
Reg. No. 26,965
Jerald L. Meyer
Reg. No. 41,194
Customer No. 20529

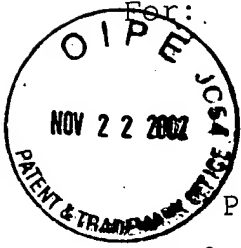
Serial No.: 09/431,159

Group Art Unit: 1764

Filed: November 1, 1999

Examiner: R. Varcoe Jr.

For:
**METHOD OF AND APPARATUS FOR PROCESSING HEAVY
HYDROCARBON FEEDS**



ATTACHMENT A - MARKED-UP COPY OF CLAIM AMENDMENTS

Please cancel claims 3 and 10 without prejudice or disclaimer to the subject matter contained therein.

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Please amend claim 1 as follows:

1. (Three-times Amended) Apparatus of processing heavy hydrocarbon feed comprising:
 - a) a heater for heating said heavy hydrocarbon feed;
 - b) an atmospheric fractionating tower for fractionating the heated heavy hydrocarbon feed fed to the inlet of the atmospheric fractionating tower producing light atmospheric fractions and atmospheric bottoms;
 - c) a further heater for heating said atmospheric bottoms and producing heated atmospheric bottoms;
 - d) a vacuum fractionating tower for fractionating said heated atmospheric bottoms and producing light vacuum fractions and vacuum residue;
 - e) a solvent deasphalting (SDA) unit for producing deasphalted oil (DAO) and asphaltenes from said vacuum residue;
 - f) a deasphalted oil thermal cracker for thermally cracking said deasphalted oil (DAO) and producing thermally cracked deasphalted oil, a thermally cracked deasphalted oil connector connecting an [the] outlet of said deasphalted oil thermal cracker [being connected] to an inlet of said atmospheric fractionating tower so that said thermally cracked deasphalted oil is recycled to the inlet of said atmospheric fractionating tower; and

g) a light vacuum fraction thermal cracker for thermally cracking said light vacuum fractions for producing thermally cracked light vacuum fractions, a thermally cracked light vacuum fractions connector connecting an [the] outlet of said light vacuum fraction thermal cracker [being connected] to an inlet of said atmospheric fractionating tower so that said thermally cracked light vacuum fractions is recycled to the inlet of said atmospheric fractionating tower.

Serial No.: 09/431,159

Group Art Unit: 1764

Filed: November 1, 1999

Examiner: R. Varcoe Jr.

For:

**METHOD OF AND APPARATUS FOR PROCESSING HEAVY
HYDROCARBON FEEDS**

ATTACHMENT B - CLEAN COPY OF AMENDED CLAIMS

Please cancel claims 3 and 10 without prejudice or disclaimer to the subject matter contained therein.

Please amend claim 1 as follows:

- F2 DCI*
1. (Three-times Amended) Apparatus of processing heavy hydrocarbon feed comprising:
- a) a heater for heating said heavy hydrocarbon feed;
 - b) an atmospheric fractionating tower for fractionating the heated heavy hydrocarbon feed fed to the inlet of the atmospheric fractionating tower producing light atmospheric fractions and atmospheric bottoms;
 - c) a further heater for heating said atmospheric bottoms and producing heated atmospheric bottoms;
 - d) a vacuum fractionating tower for fractionating said heated atmospheric bottoms and producing light vacuum fractions and vacuum residue;
 - e) a solvent deasphalting (SDA) unit for producing deasphalted oil (DAO) and asphaltenes from said vacuum residue;
 - f) a deasphalted oil thermal cracker for thermally cracking said deasphalted oil (DAO) and producing thermally cracked deasphalted oil, a thermally cracked deasphalted oil connector connecting an outlet of said deasphalted oil thermal cracker to an inlet of said atmospheric fractionating tower so that said thermally cracked deasphalted oil is recycled to the inlet of said atmospheric fractionating tower; and
 - g) a light vacuum fraction thermal cracker for

thermally cracking said light vacuum fractions for producing thermally cracked light vacuum fractions, a thermally cracked light vacuum fractions connector connecting an outlet of said light vacuum fraction thermal cracker to an inlet of said atmospheric fractionating tower so that said thermally cracked light vacuum fractions is recycled to the inlet of said atmospheric fractionating tower.